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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/625,897	07/24/2003	Axel Von Bergen	13909-118001 / 2003P00313	1193

			EXAMINER
32864	7590	05/03/2006	BRADLEY, MATTHEW A

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MINNEAPOLIS, MN 55440-1022

ART UNIT	PAPER NUMBER
2187	

DATE MAILED: 05/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>2/17/06</u>.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-30</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Response to Amendment

This Office Action has been issued in response to amendment filed 17 February 2006. Applicant's arguments have been carefully and fully considered in light of the instant amendment, but they are not persuasive. Accordingly, this action has been made FINAL.

Claim Status

Original claims 1-10, 12-30 and newly amended claim 11 remain pending and are ready for examination.

Claim Objections

The objections to claims 9,18, and 24 set forth in the Office Action dated 17 October 2005 have been withdrawn in light of Applicant's arguments.

The objection to claim 11 set forth in the Office Action dated 17 October 2005 has been withdrawn in light of the instant amendment.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 10-13 rejected under 35 U.S.C. 102(b) as being anticipated by McMahon et al. (U.S. 5,784,699).

As per independent claim 1, McMahon et al (herein after referred to as McMahon) teach,

- o an associated block of memory divided into instances such that data elements may be stored in the instances; a data structure identifying the unused instances within the block of memory; (Column 5 lines 30-31)

- o and an application interface operable to receive a request for an unused instance from a software application, (Column 5 lines 25-27)

- o wherein the frame handler is operable to identify an unused instance in response to a request received by the application interface. (Column 5 lines 30-35).

As per dependent claim 2, McMahon teach, wherein the associated block of memory is divided into frames (Column 4 lines 37-40).

As per dependent claim 3, McMahon teach, wherein each frame is divided into instances (Column 5 lines 50-59).

As per dependent claim 10, Sturges teaches, an operating system interface operable to allocate a block of memory such that the frame handler is operable to allocate an additional block of memory when the block of memory is exhausted (Column 8 lines 6-8).

As per independent claim 11, McMahon teach,

- o outputting a request from an application to an operating system for allocation of a block of memory by the operating system to the application; (Column 5 lines 25-27)

o accessing the block of memory at the application; (Column 5 lines 30-39)

o dividing the block of memory into frames; (Column 4 lines 37-40)

o dividing each of the frames into instances, with each instance operable to store data and associated with an application-defined instance type; (Column 5 lines 50-59) *The Examiner notes that the dynamic memory allocator takes the blocks, frames, from the whole memory and maintains the blocks based on bin size with respect to their availability to be allocated upon request in a free list.*

o and maintaining a data structure indicating each unused instance. (Column 6 lines 21-25).

As per dependent claim 12, McMahon teach, maintaining a data structure indicating each unused instance includes creating a node corresponding to each of the frames (Column 6 lines 21-25).

As per dependent claim 13, McMahon teach, maintaining a data structure indicating each unused instance further includes associating a list of unused instances with each node (Column 6 lines 21-25).

As per independent claim 21, McMahon teach,

o assigning a first identifier that is associated with a first memory portion to a first node; (Column 6 lines 21-25) *The Examiner notes that free list 1 is associated with a first memory portion having 16 byte blocks free.*

o   linking a first list of instances to the first node, the first list of instances corresponding to divisions of the first memory portion; (Column 6 lines 21-25)

o   assigning a second identifier that is associated with a second memory portion to a second node; (Column 6 lines 21-25) *The Examiner notes that free list 2 is associated with a second memory portion having 32 byte blocks free.*

o   linking a second list of instances to the second node, the second list of instances corresponding to divisions of the second memory portion; (Column 6 lines 21-25)

o   constructing a data structure using a plurality of nodes including the first node and the second node; (Column 6 lines 21-25 as shown in Table 1)

o   and selecting available instances from the instances for data storage by an application, wherein the instances are associated with an application-determined instance type (Column 5 lines 25-39).

As per dependent claim 27, further comprising: determining an origin list from which the available instances were selected; and returning the available instances to the origin list (Column 6 lines 21-25).

As per dependent claim 28, wherein determining the origin list comprises matching an identifier of the available instances to the first identifier or the second identifier (Column 6 lines 21-25).

As per dependent claim 29, wherein matching the identifier comprises following a pointer to a first not_empty node of a not_empty subset of the plurality of nodes, the not_empty subset including not_empty nodes with associated memory available for use by the application (Column 6 lines 21-25).

As per dependent claim 30, wherein the first memory portion includes a frame into which a block of memory allocated from the operating system is divided (Column 5 lines 56-59).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 4-9, 14-18, 19-20, and 22-26 are rejected under 35 U.S.C. 103 (a) as being obvious over McMahon (U.S. 5,784,699) in view of Sturges (U.S. 5,930,827).

As per dependent claim 4, McMahon teach the limitations found in claims 1-3 for which the instant claim depend upon.

McMahon does not teach expressly "wherein the data structure includes a tree".

Sturges teaches, "wherein the data structure includes a tree" (Column 5 lines 16-27).

McMahon and Sturges are analogous art because they are from a similar problem solving area in that both teach a dynamic memory allocation technique.

At the time of invention it would have been obvious to a person of ordinary skill in the art, having both the teachings of McMahon and Sturges before him/her, to include a tree in McMahon to manage the free memory blocks as done in Sturges to allow McMahon to more efficiently manage and search free memory blocks with the use of a tree.

The motivation for doing so would have been "the present invention may be implemented as part of any system or subsystem that manages memory allocation of a memory pool" (Column 4 lines 42-44 of Sturges).

Therefore it would have been obvious to combine McMahon with Sturges for the benefit of efficient management and search of free memory blocks with the use of a tree to obtain the invention as specified in claims 4-10.

As per dependent claim 5, Sturges teaches, wherein the tree is an AVL tree (Column 5 lines 26-27). *The Examiner notes that an AVL tree is a binary search tree as found in Sturges.*

As per dependent claim 6, McMahon teach, wherein the tree includes a node associated with each frame (Column 6 lines 21-24). *The Examiner notes that as shown supra, each entry in the free list that corresponds to a memory block, is a node that points to a free frame or memory block.*

As per dependent claim 7, McMahon teach, wherein each node is associated with a list of unused instances within the associated frame (Column 6 lines 21-24). *The Examiner notes that each entry in the list is a free block of memory or an unused block of memory.*

As per dependent claim 8, Sturges teaches, wherein the list of unused instances is represented as a ring structure (Column 12 line 66 to Column 13 line 2).

As per dependent claim 9, McMahon teach, an empty list storing each node having no unused instances; and a non-empty list storing each node having unused instances (Column 6 lines 21-25 show the empty list) and (Column 6 line 31-33 teach of a non-empty list). *Additionally, the Examiner notes that a logic level high or '1' is used by McMahon to identify groups that contain at least one available memory block* (Column 7 lines 5-23). *Alternatively, a logic level '0' would be used for blocks that do not contain available memory as taught in* (Column 7 lines 66-67).

As per dependent claim 14, Sturges teaches, associating a list of unused instances with each node includes creating a ring data structure comprised of unused instances (Column 12 line 66 to Column 13 line 2).

As per dependent claim 15, Sturges teaches, maintaining a data structure indicating each unused instance further includes organizing the nodes in a tree structure (Column 5 lines 16-27).

As per dependent claim 16, Sturges teaches, the tree structure is an AVL tree (Column 5 lines 26-27). *The Examiner notes that an AVL tree is a binary search tree as found in Sturges.*

As per dependent claim 17, McMahon teach, creating an anchor data structure including a ring including an empty list and a non-empty list (Column 6 lines 21-25 show the empty list) and (Column 6 line 31-33 teach of a non-empty list).

As per dependent claim 18, McMahon teach, wherein maintaining a data structure indicating each unused instance further includes placing nodes with unused instances in the non-empty list and placing nodes without unused instances in the empty list (Column 6 lines 21-25 show the empty list) and (Column 6 line 31-33 teach of a non-empty list). *Additionally, the Examiner notes that a logic level high or '1' is used by McMahon to identify groups that contain at least one available memory block* (Column 7 lines 5-23). *Alternatively, a logic level '0' would be used for blocks that do not contain available memory as taught in* (Column 7 lines 66-67).

As per dependent claim 19, McMahon teach, dividing the block of memory into frames includes associating a frame identifier with each of the frames (Column 6 lines 21-25). *The Examiner notes that each piece, frame, of the memory block that is available is identified by the size of the frame.*

As per dependent claim 20, McMahon teach, wherein each node includes the frame identifier of its associated frame (Column 6 lines 21-25). *The Examiner notes that each piece, frame, of the memory block that is available is identified by the size of the frame.*

As per dependent claim 22, Sturges teaches, wherein constructing a data structure comprises constructing an AVL tree using the plurality of nodes (Column 5 lines 26-27). *The Examiner notes that an AVL tree is a binary search tree as found in Sturges..*

As per dependent claim 23, Sturges teaches, wherein selecting available instances comprises traversing the data structure to locate the available instances (Column 6 lines 9-20).

As per dependent claim 24, McMahon teach, superposing a linear list over the data structure, wherein the linear list includes a first pointer to an empty subset of the plurality of nodes that has no associated memory available for use by the application and a second pointer to a not_empty subset that has associated memory available for use by the application (Column 6 lines 21-25 show the empty list) and (Column 6 line 31-33 teach of a non-empty list). *The list over the data structure is shown as Table 1 and as shown supra, the dynamic memory allocator Additionally, the Examiner notes that a logic level high or '1' is used by McMahon to identify groups that contain at least one available memory block (Column 7 lines 5-23). Alternatively, a logic level '0' would be used for blocks that do not contain available memory as taught in (Column 7 lines 66-67).*

As per dependent claim 25, McMahon teach, following the second pointer to the first node; and using the first list of instances as the available instances (Column 5 lines 21-40).

As per dependent claim 26, re-setting the second pointer to a second not_empty node in the not_empty subset, and including the first node in the empty subset (Column 5 lines 21-40).

Response to Arguments

Applicant's arguments filed 17 February 2006 have been carefully and fully considered but they are not persuasive.

With respect to applicant's argument located within the second full paragraph of the second page of the remarks (numbered as page 8) which recites:

> "In particular, McMahon is not seen to disclose at least the feature of a data structure identifying the unused instances within the block of memory."

The Examiner respectfully disagrees. As taught in McMahon column 5 lines 30-31, "The dynamic memory allocator searches a **free list**" (emphasis added). This free list is searched based on a bin size for an available memory block with that bin size, or 'instance', the memory block is within the memory itself as a whole. The bin size is the size of the memory request as taught in column 5 lines 27-30. Accordingly, the free list maintains the available memory based on bin size available for the memory request.

With respect to applicant's argument located within the first full paragraph of the third page of the remarks (numbered as page 9) which recites:

> *"In particular, McMahon is not seen to disclose at least the feature of dividing each of the frames into instances, with each instance operable to store data and associated with an application-defined instance type, and maintaining a data structure indicating each unused instance."*

The Examiner respectfully disagrees and refers applicants to the comments made supra with respect to the first point of argument. Additionally, as taught in McMahon column 5 lines 50-59, the Examiner notes that the dynamic memory allocator takes the blocks, frames, from the whole memory and maintains the blocks based on bin size with respect to their availability to be allocated upon request in a free list. Accordingly, the dynamic memory allocator of McMahon takes the blocks, 'frames', and maintains a free list, 'data structure', indicating each unused bin size, 'instance.'

With respect to applicant's argument located within the second full paragraph of the third page of the remarks (numbered as page 9) which recites:

> *"Moreover, Applicants note that the italicized arguments presented on top of page 6 of the Office Action are unsupported by specific citation to any reference ... 102(b) rejection should be withdrawn."*

The Examiner refers applicants to the bottom of page 5, in the Office Action dated 17 October 2005, that shows the cited portion followed by the beginning of the italicized comments that fall over onto the top of page 6.

With respect to applicant's argument located within the last full paragraph of the third page of the remarks (numbered as page 9) which recites:

> *"As discussed above, with reference to independent claim 1, the free list is to identify those portions of memory which are unused by the computer and which are allocated to a memory block, and is not seen to identify unused instances within the memory block itself."*

The Examiner respectfully disagrees. The Examiner notes that the free list does in fact identify unused instances within the memory block itself. As taught in McMahon, the free list is searched for available memory based on a bin size. The available memory is unused and ready for allocation.

With respect to applicant's argument located within the first full paragraph of the fourth page of the remarks (numbered as page 10) which recites:

> *"Accordingly, McMahon does not disclose at least the features of dividing each of the frames into instances, with each instance operable to store data and associated with an application-defined instance type, and maintaining a data structure indicating each unused instance, as recited in claim 11."*

The Examiner respectfully disagrees and refers applicants to the comments made supra with respect to the first point of argument. Additionally, as taught in McMahon column 5 lines 50-59, the Examiner notes that the dynamic memory allocator takes the blocks, frames, from the whole memory and maintains the blocks based on bin size with respect to their availability to be allocated upon request in a free list. Accordingly, the dynamic memory allocator of McMahon takes the blocks, 'frames', and maintains a free list, 'data structure', indicating each unused bin size, 'instance'.

With respect to applicant's argument located within the third full paragraph of the fourth page of the remarks (numbered as page 10) which recites:

> *"In particular, McMahon is not seen to disclose as least the feature of selecting available instances from the instances for data storage by an application, where the instances are associated with an application-determined instance type."*

The Examiner respectfully disagrees and refers applicants to the comments made supra. Additionally, the Examiner notes that the requests for memory are received from a software program, 'application.' Upon allocation of memory to the

requesting software program, 'selecting available instances for data storage by an

application', data is stored based on the data used by the requesting software program.

With respect to applicant's argument located within the first full paragraph of the

fifth page of the remarks (numbered as page 11) which recites:

> "Accordingly, McMahon does not disclose as least the feature of selecting
> available instances from the instances for data storage by an application, where
> the instances are associated with an application-determined instance type."

The Examiner respectfully disagrees and refers applicants to the comments

made supra.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in

this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37
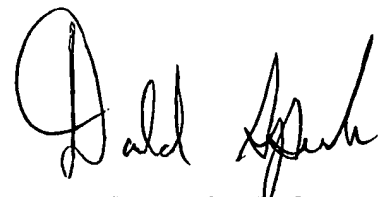
CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Bradley whose telephone number is (571) 272-8575. The examiner can normally be reached on 6:30-3:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald A. Sparks can be reached on (571) 272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DAS/mb

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